ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF PROJECT MANAGEMENT

Project Risk Management Practices of Selected Chinese Building Contractors in Ethiopia

By: Sileshi Chemir

June, 2018

Addis Ababa, Ethiopia

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A Research Project Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Master of Arts in Project Management

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Declaration

I, Sileshi Chemir, declare that this project paper is my own original work and it has not been presented to other university for a similar or any other degree award.

Sileshi Chemir	**Date**

Letter of Certification

This is to certify that Sileshi Chemir has conducted this project work entitled “Practices of Project Risk Management in the case of selected Chinese Building contractors in Ethiopia” is under my supervision.

This project work is original and suitable for the submission in partial fulfillment of the requirements for the award of Master of Arts Degree in Project Management.

Solomon Markos (PhD) ________________________________

Signature and Date

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Abstract

This study pursued to examine the extent of application of project risk management practices such as risk identification, risk analysis, risk response strategies, risk monitoring and use of risk management tools regarding two Chinese building contractors in Ethiopia, namely CSCEC and China Wu Yi. Hence, the study was designed to assess risk management practices applied in these building companies in Ethiopia. Primary data including survey questionnaire and semi structured interview were used for the purpose of the study. The questionnaire was distributed to 30 participants and collected for quantitative analysis. The interview was held with six key informants of which four of them were tape recorded and two of them were note taken. Descriptive statistics in the form of percentages and mean score were used to analyze the quantitative data; the interview data was transcribed verbatim and analyzed qualitatively. Findings from the study revealed that risk management practices have been applied moderately in the sample projects. However, most of the findings indicated that the companies more likely relied on intuition and past experiences rather than using well established risk management processes. While there are plenty of risk management practices, tools and techniques available in literature, many projects implementation teams did not often use them. From the analysis of the data collected, it was proved that risk identification and risk management strategies were comparably the predominant risk management practices in the companies whereas risk analysis and risk monitoring were considered as the least used practices. Finally, due to the low application of risk management practices on the projects, the study concluded that there should be a need to create more awareness on project risk management practices. Additional tools and risk management practices need to be developed and tested to determine which tools works best in the different scenarios and environments of the companies.

Keywords*: Risk, Risk management, Risk management process, Risk management practices*

CHAPTER ONE

1. Introduction

1.1. Background of the Study

Construction is a vital sector contributing significantly to the economic development of all nations. The construction industry must be dynamic to be able to respond to the changes that the world is constantly facing (Alhassan, 2016; Marco, 2014). Thus, due to the development of construction industry in the world in general and in developing countries in particular, construction sector is considered as a vital sector in today's economy.

Risk management is a concept which becomes very prevalent in a number of businesses. According to Gajewska and Ropel (2012), Risk Management is used in all industries, from IT related business, automobile or pharmaceutical industry, to the construction sector. Industries have developed their own RM standards but the general ideas of the concept usually remain the same regardless of the sector (Ibid). Risk management, as an integral part of project management, occurs on a daily basis. With proactive risk management, we look at projects in a comprehensive manner and assess and document risks and uncertainty (WSDOT, 2014).

Managing risks in construction projects has been perceived as a very important management process so as to accomplish the undertaking goals as far as time, cost, quality, safety and environmental sustainability (Euripides, 2008; Osipova, 2008). For this reason, consideration of the risk management process is useful for project managers as well as project teams. The implementation of risk management system in construction projects must be oriented towards the progress of the project and encompass all areas, functions and processes of the project.

A project, by definition, is a temporary endeavor used to create something that we have not done previously and will not do it again in the future (Kerzner, 2009). Because of this uniqueness, we have developed a "live with it" attitude on risk and attribute it as part of doing business (Ibid). Risk is the chance or probability of something that may or may not occur; it is something which can be quantified (using standard deviation). Risk is exposure to the consequences of uncertainty. Uncertainty is something that cannot be predicted using statistical confidence, normally because of insufficient information; risk is a measure of the probability and consequence of not achieving a defined project goal (Chapman and Ward, 2003; PMBOK/PMI, 2013).

As El-Sayegh (2014) indicated, managing risk is fundamental to the successful delivery of construction projects. Construction companies respond to risks by adopting various risk management practices (Ibid).

Risk management is the act or practice of dealing with risk. It includes planning for risk, identifying risks, analyzing risks, developing risk response strategies, and monitoring and controlling risks to determine how they have changed (Harlod Kerzner, 2009). Project Risk Management includes the processes of conducting risk management planning, identification, analysis, response planning, monitoring and controlling risk on a project. The objectives of project risk management are to increase the likelihood and impact of positive events, and decrease the likelihood and impact of negative events in the project (Chapman and Ward, 2003; PMI, 2008).

If risk management is set up as a continuous, disciplined process of planning, identifying, analyzing, developing risk responses, and monitoring and controlling, then the system will easily supplement other processes such as planning, budgeting, cost control, quality, and scheduling. Surprises that become problems will be diminished because the emphasis will now be on proactive rather than reactive management. As Ofori (2013) indicated, building a culture of risk management is primarily a process of developing people who think and plan projects effectively, and who are supported by company systems that encourage them to think and plan effectively ahead.

Therefore, construction projects are shown to be continually failing, getting more complex and the literature points to an inadequacy of uncertainty and risk management prescription and practice, particularly in the management of complexity, irrationality and non-linearity. It is therefore concluded that empirical research on the management of uncertainty and risk in complex project environments is considered a valuable contribution to knowledge (Harvett, 2013). There has been an increase in research on risk management practice in the construction industry. However, little research has been conducted to systematically investigate the overall aspects of risk management on the perspectives of various project participants.

1.2. Statement of the Problem

In order to accomplish project objectives with specific attention on time, cost quality, safety and environmental sustainability, construction project Risk Management has been identified as a key step to embark on (Alhassan, 2016). Therefore Risk Management should be emphasized in construction project, regardless of the project size to assure the achievement of project objectives. With construction projects becoming increasingly complex and dynamic in their nature as well as the introduction of new procurement methods, many contractors have been forced to have a rethink about their approach to the way that risks are treated within their projects and organizations (Ejohwomu, 2014).

Construction industry plays significant role in the economy of developing countries like Ethiopia. It also has a crucial role to play to the Growth Domestic Product (GDP) of these countries. For instance, according to the African Economic Outlook 2015 edition, Ethiopia's GDP in construction sector is 9.4% which is preceded by Agriculture, forestry, fishing & hunting (42.3%) and Wholesale & retail trade; repair of vehicles, household goods; restaurants & hotels (18.7%) (Falcioni, 2017). This indicates that construction industry in Ethiopia has become promising driver of GDP, as seen in the world's foremost emerging economies, such as Indonesia and India (Ibid).

Most studies conducted in the area of risk management have directed attention on certain aspect of construction project risk management to the neglect of a comprehensive and holistic approach with a focused view aimed at identifying construction risks, their probability of occurrence and the impact on project objectives (Ejohwomu, 2014 & Yimam, 2011), and the mitigation strategies that will be used in the event that the identified risks occur (Wysocki, 2009). This indicates that construction Risk management is presented to aid in identifying project risks, systematically analyze them and use appropriate tools and techniques in managing them.

However, according to the parties involved in Ethiopian building construction projects, most projects are not completed in conformity to the original plan i.e. they face various problems and changes that lead to delay, cost overrun or lower quality (Addis, 2014). The risks involved throughout the life of a building project might be causes for variations in project objectives if they are not managed well. As a result, many building construction projects in the country encounter considerable risk management problems and fail to recognize proactive risk management approach or even fail to distinguish the importance of this knowledge area (Addis, 2014; Dagmawit, 2016; Frezwed, 2016; Tewodros, 2017; Yimam, 2011).

Yimam (2011) for instance conducted a study to assess the PM maturity of the construction industry in developing countries (Ethiopia) and identified priority and problem area for improvement efforts. He examined that alike the case with other emerging countries, the Ethiopian construction industry shares many of the problems and challenges the industry is facing in other developing countries, perhaps with greater severity. From empirical evidence, he indicated that the risk management maturity level of Ethiopian construction projects is very poor as he stated as follows.

> *The two knowledge areas of risk and safety management are the least matured knowledge areas [in Ethiopia]. On average only 1/3 of the basic practices in the two knowledge areas were being performed. Moreover, the practitioners in the country consider them to be the least important in the management of construction projects. For practical purpose, the two knowledge areas could be considered to be totally unknown in the management of construction project in the country or practiced little or by very few in the industry. This is perhaps due to the low level of awareness and importance given to the two knowledge areas (Yimam, 2011, p. 162).*

As can be understood from the above quotation, risk management practices in Ethiopian construction industry is at its very infancy stage. This shows that construction RM process maturity and practices maturity of the contractors is found to be at low level. It can also be said that the usage and practice of risk management techniques are not known in the Ethiopian construction industry and therefore not generally used properly (Ibid). Other studies done in the country in the areas have also found similar findings. According to (Gessesse, 2009 in Yimam, 2011), formal risk management is not instituted and rarely practiced in Ethiopia. These findings are indicators of the low level of project risk management practices in the country's construction industry. For instance, one of Yimam's findings depicted that 76% of the contractors did not have risk management practices or standards.

The country's evidence also shows that though some construction companies are becoming aware of the risk management processes, but are still not using models and techniques aimed for managing risks (Addis, 2014; Karlsson, 2011). This may indicate that many contractors in the country have not still realized the importance of including risk management in the process of carrying out the project even though there is a little awareness of risks and their consequences Frezwed (2016) also indicated that risk management practice was implemented to some extent but there was a gap between the theory of project risk management and the actual practice that was performed in the study setting. Meseret (2016) also found out that lack of risk consideration was investigated as one of the constraints in planning procurement.

Local studies which have been reviewed in the current study generally confirm the inadequate risk management practices of construction projects. However, it should be pointed out that none of those studies reviewed so far had considered risk management practices of Chinese building contractors companies in Ethiopia. Therefore, due to the dearth of theoretically hinged risk management research on assessing and evaluating risk management practices and techniques in peculiar environments like Ethiopia is the motivation for undertaking this study.

1.3. Research Questions

Drawing from the research problems, the following research questions are posed:

1. What are the risk management practices being employed in selected Chinese building companies in Ethiopia?
2. What risk identification and analysis techniques do Chinese construction companies use to mitigate potential risks?
3. What strategies do Chinese buildings contractors employ to control the identified risks?

1.4. Objectives

1.4.1. General Objective of the Study

The general objective of the study was to assess construction project risk management practices of Chinese Construction Companies in Ethiopia towards typical construction project risks.

1.4.2. Specific Objectives

The study therefore sought to:

- Assess risk management practices applied in Chinese construction companies.
- Describe risk identification and analysis processes that are typically used in Chinese construction firms.
- Identify risk management tools/techniques being used to control the identified risks in Chinese construction firms.

1.5. Significance of the Study

The findings of the study would serve:

- domestic building contractors to get valuable information on how a proactive risk management practices influence the success of construction projects. risk management practitioners
- the strategic directions designed to foster a competitive construction industry in Ethiopia for the realization of Vision 2025.
- in the transfer of new knowledge as regards PRM practices to the local public and private construction industries,
- as a basis for further research.

1.6. Scope of the Study

The scope of the study is delimited to risk management practices of construction projects in Ethiopia. The study is therefore delimited to assess the project risk management practices of two Chinese construction companies in Ethiopia which were ongoing projects at the time of the study. It is confined to assess the application of risk management processes and techniques to the projects. The study also focused mainly on the project main actors such as project managers and project teams. Clients, contractors and consultants were also included in the study so as to get robust and valid data from the participants. From methodological perspectives, the study is designed to employ mixed methods research approach so as to examine risk management practices of the two building contractor firms. Thus, mixed method research design was employed in the study.

1.7. Definition of Terms

Project Risk Management - A subset of project management that includes the processes concerned with identifying, analyzing, and responding to project risk. It consists of risk identification, risk quantification, risk response development, and risk response control (Project Management Methodology Guidebook, n.d.).

Risk management practices- in this study context, RMPs refer to as simply the use of project risk management processes, tools and techniques on project activities (Gordon and Moore, 2016).

CHAPTER TWO

Review of Related Literature

2. Introduction

2.1. Definition of Project and Project Management

Project is characterized by a distinctive set of coordinated temporary activities undertaken by an individual or team to meet specific objectives within defined time, cost and quality/performance constraints. Project management can be defined as the planning, organizing, monitoring and controlling of all aspects of the project to achieve the objectives on time and to the specified cost, quality and performance. According to Project Management Institute (PMI. 2008) Body of Knowledge (PMBOK), projects, which are temporary endeavors undertaken to meet unique goals and objectives within a defined scope, budget and time frame, typically go through a life cycle. The project life cycle, which is a logical sequence of activities to accomplish the project's goals, is made up of five stages viz., the Project Initiation stage, the Project Planning stage, the Project Execution stage, the Monitoring and Controlling stage, and the Project Closure stage. Attention to detail, along with the involvement of key stakeholders and proper documentation at each stage ensures the success and quality of the project. The sequential phases are generally differentiated by the set of activities that are carried out within the phase, the key actors involved, the expected deliverables, and the control measures put in place (Project Management Institute [PMI], 2008) Chatfield, (2007) as cited in Ofori, (2013), also defines project management as the discipline of planning, organizing and managing resources to bring about the successful completion of specific project goals and objectives.

2.2. Project Management Knowledge Areas

As Project Management Institute (PMI) identified, there are ten project management knowledge areas that project managers should be familiar with in order to carry out their projects successfully (PMBOK/PMI, 2013). These areas include Project Integration Management, Project Scope Management, Project Time Management, Project Cost Management, Project Quality Management, Project Human Resources Management, Project Communications Management, Project Risk Management, Project Procurement Management, and Project Stakeholder Management. For the purpose of this work, our discussions will be focused on project Risk

Management, its processes and practices. The PMI aligns these Knowledge Areas with the five Process Groups of Project Management (PM).

A. **Project integration management-** is a project management knowledge area that includes the processes and activities needed to identify, define, combine, unify, and coordinate the various processes and project management activities within the process groups. It involves making choices regarding resource allocation, making trade-offs between and among competing objectives and alternatives, and managing the interdependencies among the knowledge areas. This includes activities needed to manage project documents to ensure consistency with project management plan and the overall project objective (Duncan, 1996; PMI, 2013).
B. **Project scope management**-includes the processes required to ensure that the project incorporates all the work required, and only the work required, to complete the project successfully (PMI, 2013). Project scope management therefore comprises all the processes involved in defining and controlling what is or is not included in a project. The main objective of scoping the project is to ensure that the project team and stakeholders have the same understanding of what product, service or result will be produced by the project and what processes will be used in achieving that goal (PMI, 2013).
C. **Project time management** -is one of the most if not the most important aspects in project management since it forms the bases upon which all activities in the project are scheduled. It is the process of planning and controlling the amount of time needed to finish a specific activity in a project. That means, it includes both planning and controlling components of project management (PMI, 2013 & Wysocki, 2009).
D. **Project cost management**-includes the processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved budget. Project cost management is one of the most important aspects in project management that require much attention since its mishandling can lead the project into a complete failure. It can affect the end result by either not meeting the performance requirement set by the sponsor or a total cancelation of the entire project if not carefully managed (PMI, 2013).
E. **Project quality management-** is the process of identifying quality requirements and/or standards for the project and its deliverables, and documenting how the project will

demonstrate compliance with relevant quality requirements. The key benefit of this process is that it provides guidance and direction on how quality will be managed and validated throughout the project (PMI, 2013). In general, Project Quality Management includes the Processes required to ensure the Project will satisfy the needs for which it was undertaken (Project Management Methodology Guidebook, n.d.).

F. **Human resource management** (HRM) can be viewed as core processes of the project-oriented company, affecting the way the organization acquires and uses human resources, and how employees experience the employment relationship (Duncan, 1996; PMI, 2013).

G. **Project communication management-**includes the processes that are required to ensure timely and appropriate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring, and the ultimate disposition of project information (Duncan, 1996; PMI, 2013).

H. **Project risk management (PRM) -** According to PMI (2013), PRM involves the processes of conducting risk management planning, identification, analysis, response planning, and monitoring and control risk on a project and the primary focus is to minimize the probability of negative impact on the outcome of the project and to maximize any opportunities that exist for positive events (Robert, 2016; The Orange Book, 2004; Williams, 2004).

I. **Project procurement management-** includes the processes necessary to acquire products, services, or results needed from outside the project team (Duncan, 1996; PMI, 2013).

J. **Project stakeholder management-** includes the processes required to identify the people, groups, or organizations that could impact or be impacted by the project. This knowledge area is very important in project risk management plan. Therefore, the focus of this area is to do a better job of identifying relevant stakeholders and keeping them in the communications channel throughout the life cycle of the project (Harold Kerzner, 2009; PMI, 2008).

Even though these knowledge areas are all equally important from a project manager's point of view, in practice a project manager might determine the key areas which will have the greatest impact on the outcome of the project. Therefore, project manager and the project team are involved in performing the above knowledge areas in line with the project process groups as indicated in the following table.

Table 2.1. Project management life Cycle with the 9 PMBOK knowledge areas spread across each phase to show the where the knowledge is used.

Knowledge Areas	Scoping Process Group	Planning Process Group	Launching Process Group	Monitoring &Control Process Group	Closing Process Group
Integration Management	X	X	X	X	X
Scope Management		X		X	
Time Management		X		X	
Cost Management		x		x	
Quality Management		X	X	X	
HR Management		X	X	X	
Communications Management		X	X	X	
Risk Management		X		X	
Procurement Management		X	X	X	X

Source: (Wysocki, 2009. P. 31)

As can be shown in the above table, Project Risk Management knowledge area is used with planning and monitoring and control process groups that indicates the processes concerned with planning risk management, identifying risk, analyzing risk, and planning risk response to a project.

2.3 Project Risk Management

Risk management is one of the nine knowledge areas propagated by the Project Management Institute (Kerzner, 2003; PMBOK/PMI, 2013; Williams, 2004). One well accepted description of risk management according to (Berg, 2010) is the following: risk management is a systematic approach to setting the best course of action under uncertainty by identifying, assessing, understanding, acting on and communicating risk issues. Risk management in the construction project management context is a comprehensive and systematic way of identifying, analyzing and responding to risks and communicating risk issues to achieve project objectives. As (Banaitiene and Banaitis, 2012 in (Banyeenzaki, 2016) define, a project risk as "an uncertain event or condition that, if it occurs, has a positive or negative effect on at least one project objective" such as cost, time and quality. Effective risk management is a critical component of any winning management strategy (Ibid).

2.4. The Risk Management Practices

Risk management is one of the most critical factors in project management practices to verify a project is successfully completed (Euripides, 2008). The construction industry faces constant challenges both from internal and external aspects. From internal perspective, the increase in the numbers of features such as internal policies, goals and objectives of the organization and the interests of stakeholders in a project's scope, construction deadlines and restricted budgets raise the complexity of building construction projects. From an external viewpoint, economic uncertainty, increased competition within the industry and the growing influence of regulatory agencies drive profit margins down. As (Antunes and Gonzalez, 2015) indicated, the construction sector relies on management practices based on intuition, experience and poor risk management.

These practices usually impede the appropriate level of ability to handle the uncertainty and complexity involved in construction projects, resulting in project failures in terms of finishing projects within deadlines, budgets, quality and expected safety. As a common practice, the building construction industry utilizes ordinary project management practices and frameworks (Ibid, 2015). Practices that are limited to assessing the consequences of deviations from the project plan rather than dealing with the causes of delays in the production system (Koskela in(Antunes and Gonzalez, 2015). However, as (Chapman and Ward, 2003; Pieplow, 2012; PMI, 2008) state, much good project management practice can be thought of as effective uncertainty management. For example, good practice in planning, co-ordination, setting milestones, and change control procedures seeks to manage uncertainty directly. In addition, key ISO principles according to (Robert, 2016) identified risk management as an ongoing process include:

- being a systematic and structured process
- being dynamic, iterative and responsive to change
- being open to continuous improvement and enhancement
- being an integral part of organizational decision making process
- being based on the best available and dependable information.

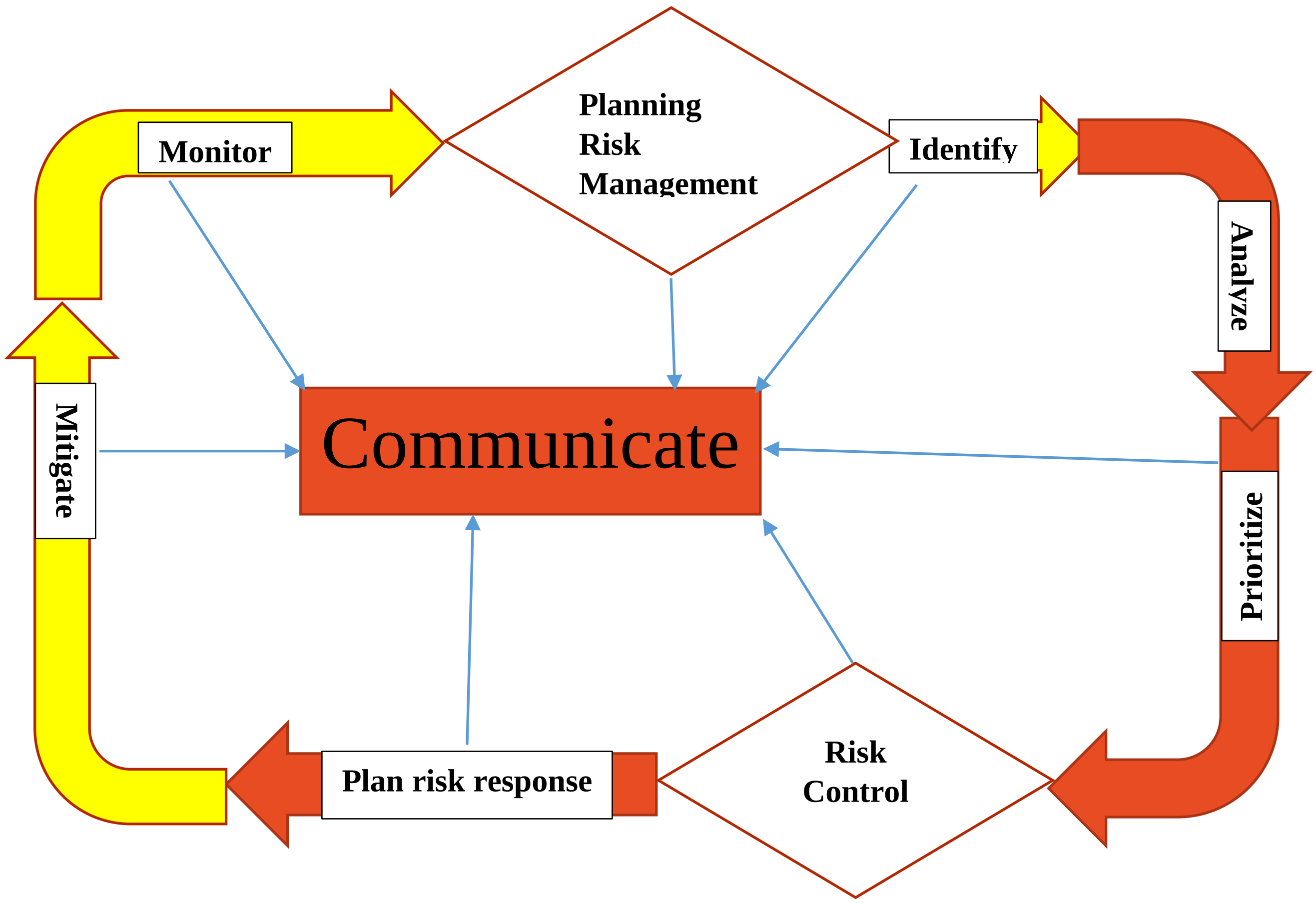
Therefore, ISO 31000 applies to existing legacy management practices to formalize and improve risk management processes (Robert, 2016). Nevertheless, most texts on project management do not consider the way uncertainty management should be integrated with project management more generally, in terms of a wide view of what a coordinated approach to proactive and reactive uncertainty management can achieve (Chapman and Ward, 2003).

2.5. Risk Management Process

The overall goal of the risk management process is to maximize the opportunities and minimize the consequences of a risk event even though variety of risk management models with different numbers of stages can be found in the literature. For example, the international standard "Project risk management – Application guidelines" (IEC 2001 in Osipova, 2008)) offers a model with four steps: risk identification, risk assessment, risk treatment, and risk review and monitoring. PMBOK's model (PMI 2000 in Osipova, 2008)) is similar but divides risk assessment into two processes of qualitative risk analysis and quantitative risk analysis. Project Management Institute

(PMI, 2008) defines PRMP as a subset of project management with four processes: risk identification, risk quantification, risk response planning and risk control. By giving focus attention to risk analysis, (Chapman and Ward, 2003; Robert, 2016) categorized the risk management into six process including plan risk management, identify risks, perform qualitative risk analysis, perform quantitative risk analysis, plan risk responses and monitoring and control risks. These processes can also be categorized into two main interrelated phases after decision is made about risk management planning: (a) risk assessment phase and (b) risk control phase (Williams, 2004). The risk assessment phase involves risk identification, risk analysis, and risk prioritization whereas risk control phase comprises of risk plan, mitigate and risk monitor. Despite the variety of models mentioned by different scholars, planning risk management and risk control are used as main decision areas of project risk management processes by incorporating all the other specific RMP mentioned under the models. Therefore, the following model is adopted for the purpose of this study (Figure 2.1)

Figure 2.1. Project Risk Management Cycle adopted for this study (Williams, 2004)



Risk management is currently considered as a mandatory part of project management, and also as an integral part of successful project management. The process is iterative and continuous, and is composed of a series of cycles through which the level of understanding risks is increased. In addition, it is applied throughout the whole life cycle of the project. Hence, it is essential to consider that risk management be done iteratively, throughout the project, as a part of the team's project management routine. Generally, Project risk management includes the processes of conducting risk management planning, identification, analysis, response planning, and monitoring and control of project risk. The objectives of risk management are to increase the probability and impact of positive events, and decrease the probability and impact of negative events in the project.

PMBOK's Risk Management Processes are Plan Risk Management, Identify Risks, Perform Qualitative risk analysis, Perform Quantitative risk analysis, Plan risk Responses, Monitor and Control risks. Raz et al (2002 in Musyoka, 2012) identifies 5 PRM practices which include;

systematic risk identification through documentation reviews and information gathering techniques such as interviews and SWOT analysis; probabilistic risk analysis including the assessment of likelihood that a risk will occur and the consequences if it occurs; detailed planning for uncertainty to reduce the probability and/or the consequences of an adverse risk event to an acceptable threshold; methodic trade-off analysis resulting in a detailed risk response plan and appointing a risk manager. The following sections thus present project risk management processes as indicated in the above model.

2.5.1. Risk Management Planning

A cautious planning is a must for successful risk management outcomes. The main output of this process is the project risk management plan that details the risk management methodology, roles and responsibilities, budgeting and timing requirements, risk categories and probability and impact matrix (PMBOK, 2004). Hence, construction projects are expected to be engaged in risk management planning and need to perform the planning activities in regular basis. Project teams hold risk management planning meetings to define risk management activities and develop the risk management plan for the project.

2.5.2. Risk Identification

This stage necessitates a comprehensive knowledge of the firm, together with various factors such as the organization's market, the environment (legal, social, political and cultural), an in-depth understanding of the firm's strategic and operational objectives, the firm's critical success factors and the threats and opportunities that may prevent the firm from achieving of these objectives (Renault et al., 2016). An important tool in the identification process is a SWOT analysis, a matrix conducted by the firm by which **S**trengths, **W**eaknesses, **O**pportunities and **T**hreats are identified (Ibid). Risk identification is a meticulous process, and a firm should ensure that all significant organizational processes are identified and that all the risks emanating from these processes are well-defined. Additionally, any volatility linked to these processes should be identified and grouped (FERMA, 2003 in Renault et al., 2016)

Therefore, identifying project risks is a key to managing them. The project manager and project team need to identify all potential project risks regardless of their probability or impact. Risk identification relies heavily on the experience and insight of the key project personnel (Bajaj et al., 1997 in El-Sayegh, 2014)). Risk identification is also a brainstorming activity that requires the involvement of key team members. As El-Sayegh (2014) indicated, to help identifying risks, the project team needs to review and evaluate all project documents specifically the scope statement, the work breakdown structure (WBS), project milestones and project deliverables. In helping to identify key risks to the organization, workshops may be facilitated, where unrestricted information sharing and debate are encouraged. This can provide valuable information in the identification, assessment and management of risks.

2.5.3. Risk Analysis

Risk analysis is an evaluative process that serves the purpose of establishing some understanding of the magnitude of the risks faced by an organization in undertaking a project. According to Berg (2010)**,** risk analysis involves the consideration of the source of risk, the consequence and likelihood to estimate the inherent or unprotected risk without controls in place. That means risk analysis entails the determination of risk impact and the probability of risks occurring in a project. The analytical process decomposes each risk into its constituent components and subjects them to some form of assessment.

Qualitative and quantitative risk analysis techniques are used depending on the risk, the purpose of the analysis and the information and data available (Ibid). According to UP Version (2006), qualitative risk analysis includes methods for prioritizing the identified risks for further action. Qualitative techniques can often be used for screening risks. The main goal is to reduce the level of uncertainty and to focus on high-priority risks (Frýdlová, 2016). He also indicates that such analysis is usually performed when there is a need to quickly assess and identify the biggest risks; this performance demands lower requirements of the range of inputs and financial resources (Ibid). The main input is the risk register where are listed the all known risks. Risks can be estimated qualitatively using tools such as hazard matrices, risk graphs, risk matrices or monographs but noting that the risk matrix is the most common. Applying the risk matrix, it is required to define for each risk its profile using likelihood and consequences criteria.

Quantitative Risk Analysis is performed on the risks that have been identified in Qualitative Risk Analysis process as potentially and substantially impacting the project's competing demands (UP Version, 2006). It analyzes the effect of those risk events and assigns a numerical rating to those risks. (Ibid). This means that Risk Quantification is a further analysis of the risk management. It is the process of the numerical evaluation of the identified risks. The main goal is to estimate the frequency and the severity of losses jeopardizing the project and prioritize the risks by their cost, schedule and performance (PMBOK/PMI, 2013). Based on the detailed examination of the risks, the project manager gets the information for the decision making about those risks (PMBOK/PMI, 2009).

2.5.4. Responding to Risk (Risk Mitigation)

This step starts the planning of Risk Mitigation process. Once the risk has been identified and analyzed, there is still the question of response (Chapman and Ward, 2003). While risk identification and analysis provide us with an understanding of what can happen on the project, risk response planning supplies us with actions we can take either to avoid a risk event or to diminish its impacts and addresses the responses that will be made to individual risks. Risk response planning is concerned with developing strategies to cope with risk events. PMBOK/PMI defines Risk Response Planning as the process of developing options and actions to enhance opportunities and to reduce threats to project objectives. Risk Response actions (strategies) may include (UP Version, 2006, p. 4 and Wysocki, 2009, p. 43):

Risk mitigation*- involves taking early action to prevent or reduce the likelihood of risk.*

Contingency*- contingency plans define actions to be taken in response to identified risk triggers in hopes of reducing potential project impact from identified risk.*

Transfer*- Risk transfer involves shifting the responsibility/ownership of the risk to other party.*

Avoidance*- Risk avoidance involves changing the project to eliminate the threat from identified risk.*

Acceptance*- Risk acceptance simply involves acknowledging risk as part of the project and accepting the consequences of its occurrence.*

Risk management is probably the most difficult aspect of project management. Since unmanaged or unmitigated risks are one of the primary causes of project failure, risk management must be a vital and significant concern to project managers (Thaheem and Marco, 2013a). Therefore, a project team must be able to recognize and identify the root causes of risks and to trace these causes through the project to their consequences.

2.5.5. Risk Monitoring and Control

This step concludes the risk management process Risk monitoring and control process is the process of identifying, analyzing and planning for risk, keeping track of identified risk, reanalyzing existing risk, monitoring risk symptoms and triggers and reviewing the execution of risk responses strategies while evaluating their effectiveness (The Orange Book, 2004). Risk control involves risk response planning, risk mitigation, and risk monitoring (Boehm, 1989 in (Frezwed, 2016). Each of these will be discussed in this section. It is essential that risk management be done iteratively, throughout the project, as a part of the team's project management routine.

Generally, regardless of the type of communication to be undertaken, the method for applying communication will always significant at every stage of risk management processes. Rich, accurate and timely communication is critical to the success of any project since communication barriers could result in increased project risks. Clear project communication thus ensures that the right stakeholders have the correct information, at the right time to make well-informed decisions.

2.6. Risk Management Tools and Techniques

All projects assume some element of risk, and it is through risk management where tools and techniques are applied to monitor and track those events that have the potential to impact the outcome of a project. According to Thaheem and Marco (2013), the area of Project Risk Management (PRM) has been extensively researched, and the utilization of various tools and techniques for managing risk in several industries has been sufficiently reported. However, risk Management in the Ethiopian construction industry is still a new concept. Companies and industrial practitioners rarely utilize the tools and techniques of risk management.

2.7. Risk Management Response Strategies

Risk response focuses on the identified and quantified project risks. Risk responses include, eliminating the risk by avoiding it usually by treating the root causes; accept the risk but have a contingency plan in place; shift risk to a third party by transferring it, for example, through insurance; and reducing the likelihood of its occurrence by mitigation (Mousa, 2005 and Musyoka, 2012). Risk response strategies are the approaches made in dealing with the risks identified and quantified. The strategy(s) most likely to be effective should be selected for each risk (PMBOK, 2004).

2.8. Risk Management in Construction Projects

According to Guérin (2012), since 2003 the Project Management Institute has published the Construction Extension for the PMBOK Guide®. She stated that the purpose of the Extension is to improve project management of construction projects by emphasizing those methods and techniques that are particularly important to this subset of projects.

Risk management in construction project context is a formal process that enables the identification, analyses, planning and management of risk throughout the project lifecycle (PMI, 2008). Studies show that risk and uncertainty have continuously distressed the construction industry compared to other industries due to its complexity, magnitude and time consuming characteristic (Kang et al., 2015). Regardless of their size and complexity, all construction projects involve risks with varying impacts. According to Edwards and Bowen (1998), risks often have a significant impact on the project budget and therefore play an important role in the total costs of a project. Further, Baloi and Price (2003) in Kang et al.(2015) stated as projects are often open systems, rather than closed systems, construction projects in general carry a lot of variation and uncertainty. New construction projects mostly motivate the participants and they often enthusiastically underestimate the risk, probably based on the prior preparations and project management, which leads to an attitude of idealism (Thaheem and Marco, 2013).

Therefore, there is no way PRM can be overlooked because of its function of dealing with potential exposures (Griffis & Christodoulou, 2000 in Thaheem and Marco, 2013). Risk management (RM) thus should be emphasized and implemented in construction projects, regardless of the project size, to assure the completion of project objectives. To accomplish this, project schedule, budget, cost or quality may be revised so that uncertainties can be reduced and the project objectives can be kept integral (Ibid).

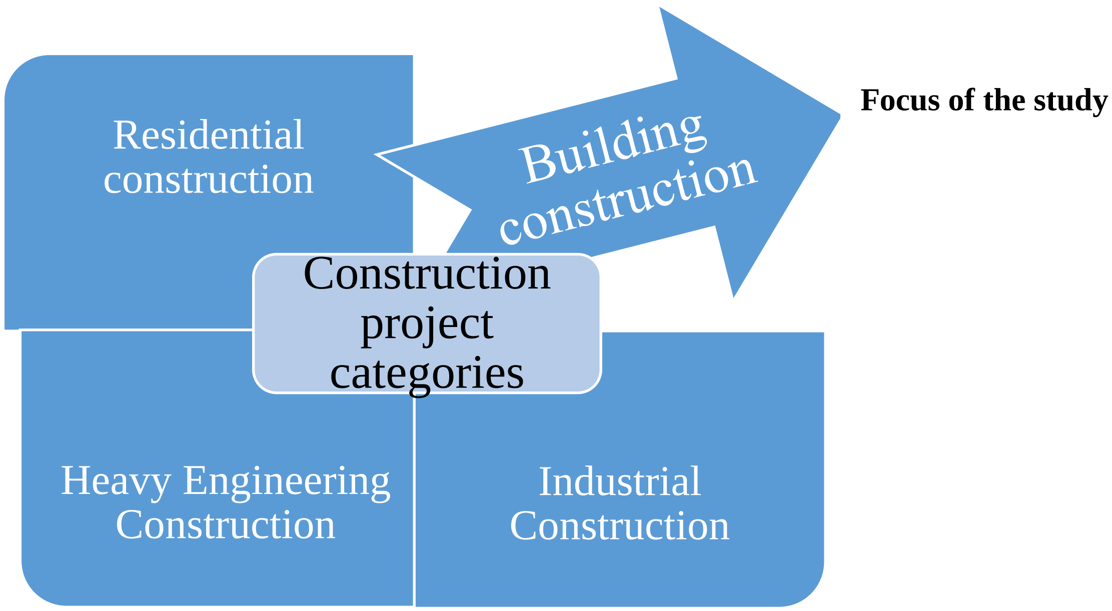
According to the ‘State of the South African Construction Industry Report’ published in 2012, the value of the construction industry in South Africa was R34 billion which translated into a contribution of just over 3% to the GDP (Industry Insight, 2012). The industry was also found to be a major contributor to employment – it employed just under a million people in 2011 (Industry Insight, 2012);however, the industry is experiencing a major decline - it was stated that the year 2012 was considered the worst yet when compared to the recent past (Williams, 2013 in Gupta et al., 2015)).

Large construction projects are exposed to uncertain environment because of such factors as planning, design and construction complexity, presence of various interest groups (owner, consultants, contractors, suppliers, etc.), resources (manpower, materials, equipment, and funds) availability, environmental factors, the economic and political environment and judicial regulations. For instance, according to Banaitiene and Audrius (2012), in the European Union construction is the sector most at risk of accidents, with more than 1300 people being killed in construction accidents every year. Worldwide, construction workers are three times more likely to be killed and twice as likely to be injured as workers in other occupations (Ibid). The costs of these accidents are immense to the individual, to the employer and to society. They can amount to an appreciable proportion of the contract price (European Agency for Safety and Health at Work. Report cited in Banaitiene and Audrius, 2012).

Managing risks in construction projects has been recognized as a very important process in order to achieve project objectives in terms of time, cost, quality, safety and environmental sustainability (Edwards and Bowen, 1998; Guérin, 2012; Kang et al., 2015; Shadan, 2012). Project risk management is an iterative process: the process is beneficial when is implemented in a systematic manner throughout the lifecycle of a construction project, from the planning stage to completion. In general, construction projects have often suffered from high fragmentation, large waste, poor productivity, cost and time overruns, and conflicts and disputes for a long time. Thus, many new and innovative management and procurement systems in construction are introduced such as partnering, joint venture, alliances, supply chain management, enterprise resource planning (ERP), just in time (JIT), and total quality management (TQM) to meet these challenges (Hai et al., 2012).

According to Mousa (2005) and Gupta et al.(2015), the construction projects have been divided into four main categories: residential construction, building construction, heavy engineering construction and industrial construction. Figure 2 depicts construction project categories with the focus of the current study.

Figure 2.2. Construction project Categories Adopted from Mousa (2005) & Gupta et al (2015)



Construction industry contributes immensely to economic growth and development of both developed and developing countries. Research in the construction industry shows that it contributes on average between 5 and 10 percent of GDP in all countries. According to (Levy,2000 as cited in Mousa, 2005), the construction industry is a vital part of the American economy; it provides jobs for 8 million people and creating a 12% slice of the U.S GDP. In the United Kingdom, the construction industry directly employs about 1.7 million people. It accounts for about 6% GDP (NAO, 2001 cited in Mousa, 2005). As (Hansen-Addy and Fekpe, 2015) pointed out, in Ghana, the construction industry contributes about 6-10% of GDP and provides employment for 3.1% of the Ghanaian Labour force (GSS, 2012 in Hansen-Addy and Fekpe, 2015).

Construction projects are used to produce structures ranging from small retail stores to urban redevelopment complexes, from grade schools to complete new universities, hospitals, commercial office towers, theaters, government buildings, recreation centers, light manufacturing plants and warehouses. Economically, this sector typically accounts for 35% to 40% of the construction market (Mousa, 2005).

2.9. RMP of Construction Industry in Developing Countries

Risk management technique in construction industry is a less popular concept. Although various publications on risk management are available both electronically and in hard copies, little information is known on the applications of risk management in practice, specifically in developing countries like Ethiopia. The process of risk management has also not been adequately explored. The existing literature on construction project risk management in developing countries thus lacks ample risk management process approach capable of capturing risk impact on diverse project objectives. For instance, a study carried out by Bowers and Khorakian (2014 cited in Bahamid and Doh, 2017) stated they are of the opinion that in most construction industries in developing countries of the world, very little facts on successful implementation of risk management systems is known. As a result of such negligible attention paid to risk management, the focus of researchers in developing countries has been on encouraging the use and application of risk management systems (Ibid).

A study conducted by (Banaitiene and Audrius, 2012) on Lithuanian contractors' attitude towards risk management using mixed methods research approach concluded that to manage construction risks effectively and efficiently, the contractors have to understand risk responsibilities, risk event conditions, risk preference, and risk management capabilities. Construction companies that manage risk effectively and efficiently enjoy financial savings, and greater productivity, improved success rates of new projects and better decision making (Ibid).

Musyoka (2012) adopted the case study of the Kenya Airports Authority in an effort to establish the influence of project risk management practices on success of capital projects. He concluded that while there are a number of project risk management practices available, many project managers are still reluctant to apply them in their projects perhaps due to lack of awareness and over-optimism. One of the findings of (Ejohwomu, 2014) indicated that risk management in construction business in Nigeria is one of ‘lip services’ and “avoidance of risk” was regarded by participants as their preferred risk response technique. In addition, the findings of a study that assessed the risk management practices of Ghanaian Contractors towards typical construction project risk factors showed contractors mostly refer to previous and ongoing similar projects practices for accurate program as the most effective used method for risk prevention (Alhassan, 2016). He also recommended that project risk management should become part of the culture in project management activity and routine component in any project plan and review activity (Ibid).

From local point of view, the construction industry in Ethiopia is the major sector where public and private sectors are investing huge amount of fund (MUDAC, 2012). It has significant contribution to the growth domestic product of the country’s economy. For example, the percentage share of the construction sector to GDP at constant basic price has increased from 4.3% in 2000 to 5.8% by 2010 (MUDAC, 2012). According to the African Economic Outlook of 2015 edition, the GDP percentage was increased to 9.4% in Falcioni, 2016 which was preceded by Agriculture (42.3%) and Wholesale businesses (18.7%). Despite this economic impact, project risk management practice maturity of the construction industry apparently appears to be at its very infant stage.

Few locally conducted studies show that risk management practices in Ethiopian construction projects are generally inadequate. For instance, Frezwed (2016) conducted a study on risk management practice on Batu and Dukem town water supply projects. She concluded that practice of project risk management is to some extent implemented but the whole theory and processes used within project risk management are not practiced in managing the projects. The other study was conducted by (Karlsson, 2011) on Project Management in Sweden and Ethiopia using mixed methods research. One of his findings has implication on project risk management. He depicted that project control is not prioritized in the Ethiopian culture and problems [risks] are solved as they occur rather than controlling the project risk ahead to avoid problems [risks]. This causes several problems in the Ethiopian projects that could have been avoided if an efficient project [risk] control were conducted. However, the Swedish culture is strongly connected to control and construction companies often have well developed methods to control their projects [risks and uncertainties] (Karlsson, 2011). This is just as the approach to planning, developed through the companies' extensive experience within construction (Ibid). (Meseret, 2016) also conducted a study to examine the project procurement practices in areas of procurement planning, conducting, controlling and closing. She found out that even though the company under study had a plan for procurement practices, it didn't include the risk management practices in its plan. This means the company did not have proactive risk mitigation plan.

Construction projects are initiated in complex and dynamic environments resulting in circumstances of high uncertainty and risk, which are compounded by demanding time constraints. The management of risk is one of the most important issues facing the majority of the construction firms in developing countries in general and less developing countries like Ethiopia in particular. So, Ethiopia currently seems facing major challenges in managing construction industry in terms of risk management practices which is particularly reflected through cost overrun, schedule delay and performance constraints. The industry is still at the infancy stage, growing unfortunately, slowly both technically and financially. Like in other developing countries, the construction industry in Ethiopia is overwhelmed by many problems (Abadir, 2011 Tsegay, 2016). Thus, the current state of the construction industry can be characterized by utilization of old equipment and low levels of availability, severe shortage of construction materials, low level of management, especially project management knowledge and practice, insufficient and ineffective labor-based construction technology), inadequate and inappropriate project organization structures, which lead to problems of responsibility, communication and coordination, etc. (MUDAC, 2012).

In cognizant of these and other situations, the government of Ethiopia was forced to revise its foreign investment policy to attract foreign companies to participate in the country's construction industry. As a result, in February 2016, the Ethiopian Investment Commission (EIC) announced it was to revise regulations that slow down foreign Direct Investment (FDI) inflows to the country and would implement these changes soon. The Commissioner of the EIC stated that the new laws would create a favorable business environment as well as improving Ethiopia's standings on the World Bank Ease of Doing Business (Falcioni, 2016). According to Business Monitor International (BMI), Ethiopia's investment into the fixed capital formation and construction industry would grow by 14% per year over 2016 and 2017 (Deloitte & Touche, 2016). This condition would also attract Foreign Direct Investments (FDIs) in to the country (Ibid).

2.10. Chinese Construction Companies in Ethiopia

Despite the booming domestic construction market, an increasing number of Chinese Construction firms (CCFs) have ventured overseas for market expansion, and thus are simultaneously exposed to higher business risks (Xianbo et al., 2012). Since the fall of Derg regime in 1991, amiable relations have developed between China and Ethiopia, forming a positive political milieu in front of which the countries' interests have increasingly converged (Françoise, 2017). According to Santander, Ethiopia's main investment partners are Saudi Arabia, China, the United States, India and Turkey (Falcioni, 2016). China is the country's main trading and investment partner, offering factory construction and infrastructure projects. Today, although the Ethiopian government is careful to say that all investors are welcome, the close political relationship between China and Ethiopia has helped to cement China's role as a primary economic partner. For instance, Addis Ababa Ring Road Project used to be the first important project by which Chinese contractors opened huge potential market in Ethiopia followed by Addis Ababa Rail project and other construction infrastructures.

Mo et al. (2008) indicated many Chinese construction companies perceive a serious disadvantage compared to western firms due to a relative lack of skilled labor, management training, and communications infrastructure. In spite of the perceived shortcomings, Chinese construction firms have proven their capacity to stay cost-competitive with Western firms (Mo et al., 2008). In the scramble for market share, low cost continues to be important in maintaining a competitive advantage (Ibid). Therefore, Ethiopia has officially welcomed Chinese construction companies as reasonably inexpensive alternative to Western companies. The Chinese construction companies may not achieve large profits, but they are gradually taking up more angles in the Ethiopian construction market. According to Mekonen Hailu, EIC Communications Director, 279 of the total 379 Chinese companies were set operational in Ethiopia with projects that worth over 13.16 billion Ethiopian birr (over 572 million U.S. dollars) from 2012 to 2017 period, while the remaining 100 are under implementation (dawn loaded on 2017-07-19 04:18:54|).

Moreover, most Chinese construction companies are the well-run companies that have developed reputable policies and procedures around the world. For example, China State Construction Engineering Corporation Ltd (CSCEC), which is the focus of this study, has recently signed the contract for the project of New Headquarter Building of Commercial Bank of Ethiopia (CBE), with the contract value of US$ 266.5 million. Located in the CBD of Addis Ababa, the capital of Ethiopia, the Project had the overall building area of 150,000 m^2 inclusive of one main tower building of 46 floors above ground and 4 floors underground, and two 5-layer podiums (CBE Project Office, 2018). It is one if the major construction companies in the world ranking at top among the world fortune 500 companies and also have been on 11 consecutive years, ranked "World ten largest housing contractors". "Global top ten builders of medical and other public work project" and become the number one residential project builders in the world.

The second Chinese construction firm chosen for this study is China Wu Yi. It is a large scale state-controlled enterprise with capital, technology and management intensive, taking real estate industry as its foundation, investment and development as its focal point, and foreign-oriented economy as its leading factor (http://english.chinawuyi.com, downloaded on March 29, 2018). According to the preliminary data gathered from the firm's project manager and client representative, China Wu Yi is a construction company operating in Ethiopia. It is developing strong reputation in the country after signed an agreement with Zemen bank and is currently undertaking the Head Quarter Building Project of Zemen Bank (which a 32 story building project). The company has managed to win its first endeavor in the country. However, on the continent, this is its second project, after its 2011 construction of a 26-storey building for the KCB bank in Kenya.

CHAPTER THREE

Research Approach and Design

3.1. Research Approach

Research approach is about turning research questions into the research project (Robson 2002 in Osipova, 2008). Since there is a growing support for methodological pluralism, project management becomes increasingly viewed from different perspectives by different scholars (Sankaran et al., 2015). As a philosophical underpinning for mixed approach, Creswell (2003) conveys the importance for focusing attention on the research problem in social science research and then using pluralistic approaches to derive knowledge about the problem. Thus, mixed method approach was adopted to investigate the risk management practices of the target companies.

3.2. Research Design

In order to answer research questions, the appropriate strategies, methods and techniques should be chosen. As Yin (2009, 1994) suggests, the types of research questions determine the most suitable strategy. The research questions in this study focus mainly on "what" questions. To answer this type of question, a survey design is proposed (Yin, 1994) followed by a series of interviews with project managers. The research design presented in this project work was of a descriptive type. Descriptive research aims at identifying and recording a phenomenon, process or system and may be conducted using surveys (Fellows and Liu 2003). Thus, as both references suggest, survey technique and interview are chosen for data collection. The main tool of the study is a questionnaire survey followed by a series of interviews with project managers. The survey sample comprised project managers, project team, clients, contractors and consultants who are expected to employ risk management in a given project.

3.3. Data Types and Sources

There are two types of data sources namely primary and secondary data (Kothari, 2004). The primary data are those which are collected afresh and for the first time, and thus happen to be original in character (e.g. interview and questionnaire). Secondary data is defined as data that have been previously collected for some other purpose. Hence, for this study, both primary and secondary data sources are proposed. As regards primary data, information will be obtained through the administration of different data gathering tools such as interview and survey questionnaire to the respondents that will be selected using purposive sampling technique. Regarding secondary data, documents available will be analyzed and reviewed in line with literature pertinent to the study.

3.3.1. Instruments of Data Collection

Data is a proof that directs the researcher towards research objectives. Thus, data collection was done using a closed and opened ended questionnaire and semi structured interview. The questionnaire was delivered to 30 respondents by the researcher and were collected back after the questionnaire had been filed by participants. The mailed questionnaires were returned very late because respondents from the CSCEC Company were so busy with tight project schedule.

3.3.1.1. Questionnaire

The purpose of questionnaire was to get a picture of the risk management process from the different actors' perspectives. Thus, the survey which involved the questionnaire was carried out to seek risk management practices of project actors. A four pages questionnaire accompanied with a covering letter was delivered to 30 target population in the two companies as their number is manageable. The questionnaire was framed and constructed by adapting questionnaires that have been used for similar purposes. The survey questionnaire in the form of Likert scale was used in order to touch details that may be difficult to address through other tools such as interview. It also helped the researcher minimize any error or bias in the data that may arise due to close interaction during the interview with participants.

3.3.1.2. Interview

Interview with project participants aimed to get a deeper analysis of the risk management process and find risk management practices of the companies under study to get some insights. Before conducting an interview, the researcher prepared an interview schedule consisting of semi structured questions. Based on these questions, some probing questions were also asked to obtain an in depth information from the participants. The willingness of the participants was assured before the interview was conducted to address ethical considerations. Four of the interviews took place in the respondents' site office; the interview was conducted via translation. Since there was only one translator, it was difficult to address each interviewee separately. So, the interview was held with all respondents at a time as though it were focus group discussion. Whereas two of the interviews done at respondents' office. Five allowed the interviewer to record the interview while one allowed only notes to be taken.

3.4. Target Population of the Study

The population for this study were staff working in the two Chinese building contractors companies, namely China State Construction Engineering Co. Ltd and China Wu Yi Co., Ltd. currently operating in Ethiopian construction industry. CSCEC (state owned) is undertaking the New Head Quarter Building Project of Commercial Bank of Ethiopia (state owned enterprise). China Wu Yi (state owned) is currently undertaking the Head Quarter Building Project of Zemen Bank (private enterprise). Hence, the target population of the study were mainly project managers and project teams from the two companies because they were the front line of risk management issues.

The sampling design employed for this study was non-probability sampling as the sample size required for the research was selected based on the convenience (judgement) of the researcher and manageability of the sample population. As Saunders et.al, (2009 in Frezwed, 2016) indicated, for non-probability samples, the probability of each case being selected from the total population is not known. Creswell (2012) & Kalton (1983) also explained in non-probability sample, respondents will be selected based on their convenience and availability.

3.5. Data Analysis and Presentation

In this study, mixed data analysis was used. The results were analyzed in percentages and figures using descriptive statistics and presented in the form of bar charts and tables. Firstly, quantitative data was analyzed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics was used to report means, and frequency counts for each item. Secondly, data obtained through interview was discussed and analyzed qualitatively. Then, results were discussed by combining interview results with survey data.

3.6. Organization of the Study

The study was organized in to five chapters. Accordingly, chapter one began with the introduction section of the study followed by back ground, problem statement, research questions, and objectives of the study, significance of the study and scope of the study. In the second chapter, relevant literature which includes theoretical and empirical evidences was thoroughly reviewed. In the third chapter, the research methodology including research design and approach, sources of data, method of data collection, population of the study and sampling design, method of data analysis and presentation and organization of the study were presented. In the fourth chapter, results of the study were discussed and reported. Finally, based on the findings, conclusions and recommendations were posed.

CHAPTER FOUR

Results and Discussion

4. Introduction

This chapter presents data analysis and interpretations, which draws from the objectives of the study. The analyses are both qualitative and quantitative. The chapter is structured according to the questions in the questionnaire and provides discussion of the findings, their implications. Moreover the additional data and observations, gained from the survey will be as well incorporated into the discussion.

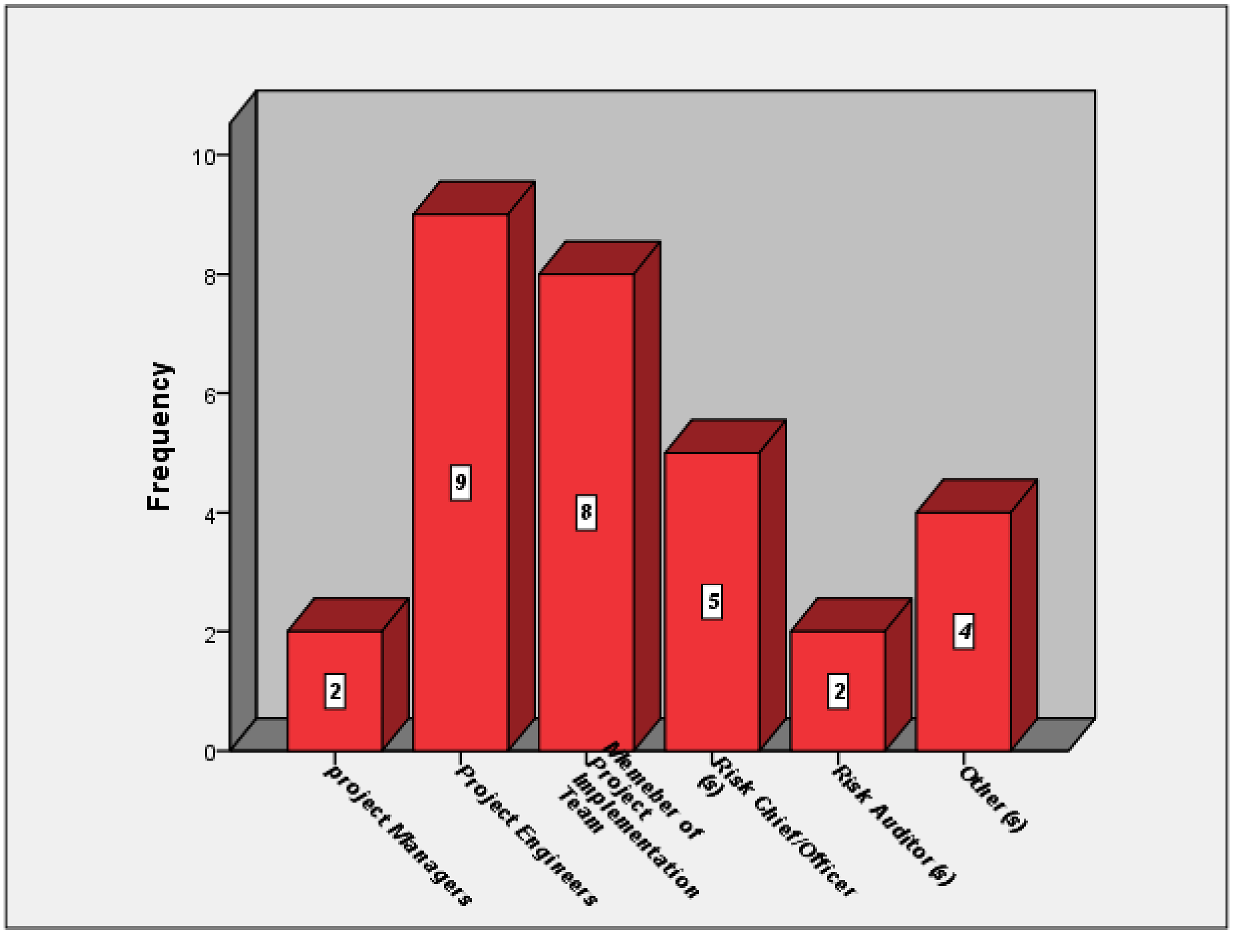
In addressing the research questions raised in the first chapter, a survey instrument and semi-structured interview questions were designed to capture information on risk management practices through risk identification techniques, possible risk description and analysis techniques, risk response strategies, risk monitoring and control and risk management techniques. Construction project risk management practices help determine what project risks or hazards exist or are anticipated, their remoteness in time, duration period and possible outcomes.

Therefore, 30 questionnaires were administered to the sample participant and responses were received. In a Likert scale of 1-5, the respondents were required to indicate the level of applicability of project risk management practices to their projects. A level of 1 indicated that the practice was not applicable to the project while a level of 5 indicated that the practice was applicable to very great extent to the project. Thus, biographical profile of the respondents sets off the discussion.

4.1. Profile of the Respondents

Figure 4.1 shows the breakdown of participants' organizational background information. The results shows that of the total of 30 participants, two (6.7%) project managers; 9(30%) project engineers; 8(26.7%) project implementation teams; 5(16.7%)project risk officers; 2(6.7%) risk auditors and the remaining four (13.3%) were site/office Engineers labelled as 'others'.

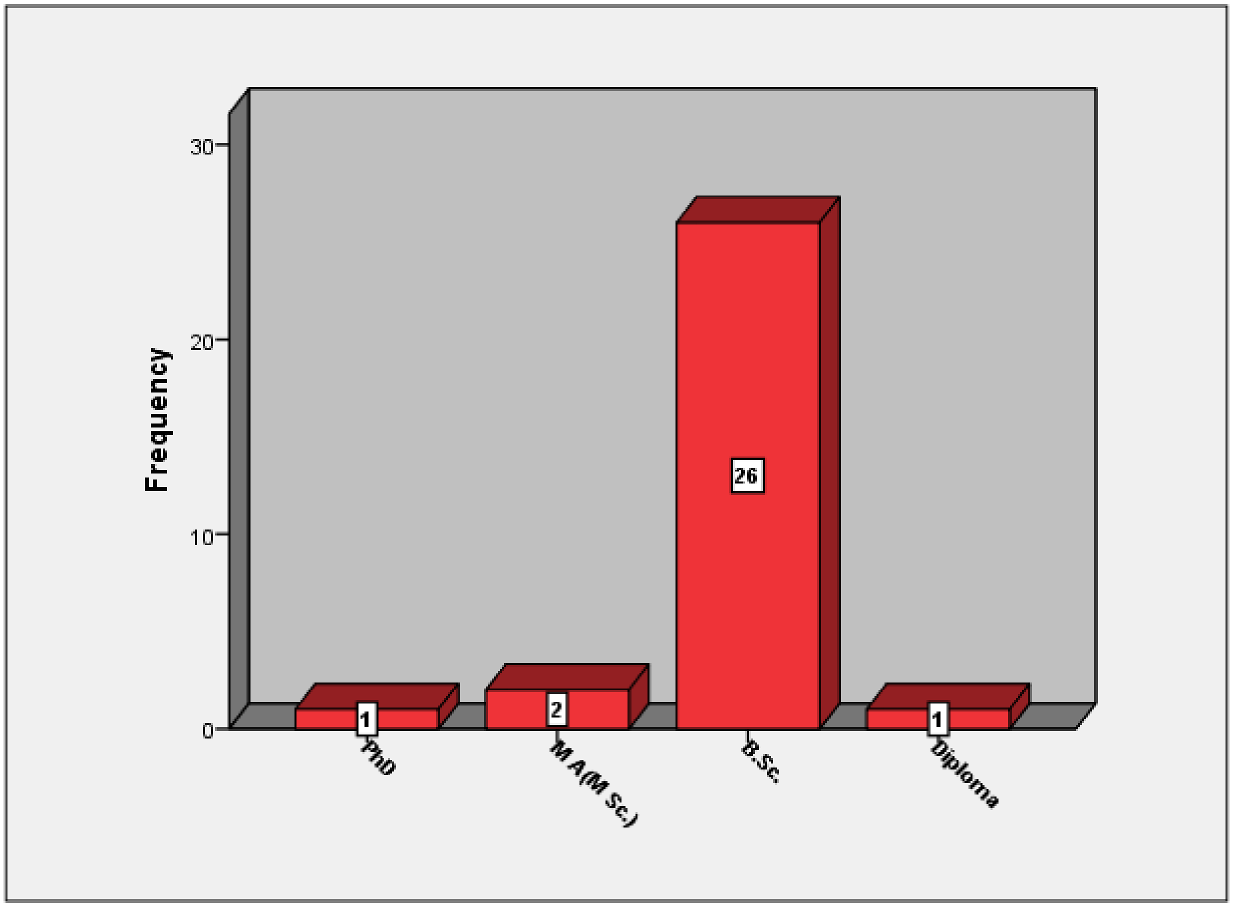
Figure 4.1.1. Respondents' position/role in the project



Source: Survey data (2018)

As can be observed in figure 4.2 below, 96.7% of the respondents are B.Sc. degree and above holders. Their educational level can be indicated as follows: 1(3.3% %) PhD, 2(6.7%) M.A (M.Sc.) holders, 26(86.7%) B.Sc degree holders and 1(3.3%) Diploma holder. From this, it can be inferred that majority of the respondents might have good insights and understandings about project risk management practices. For example, one of the key informant interviewee suggested as 'since I am a construction professional, I know what the term; what the term risk management means' and concluded that it is the systematic way of how to managing the risk, which is identifying, planning, assessing, monitoring and controlling. It is a process of systematically arranging or controlling the project in order to minimize or reduce the exposure of risks (see Appendix C).

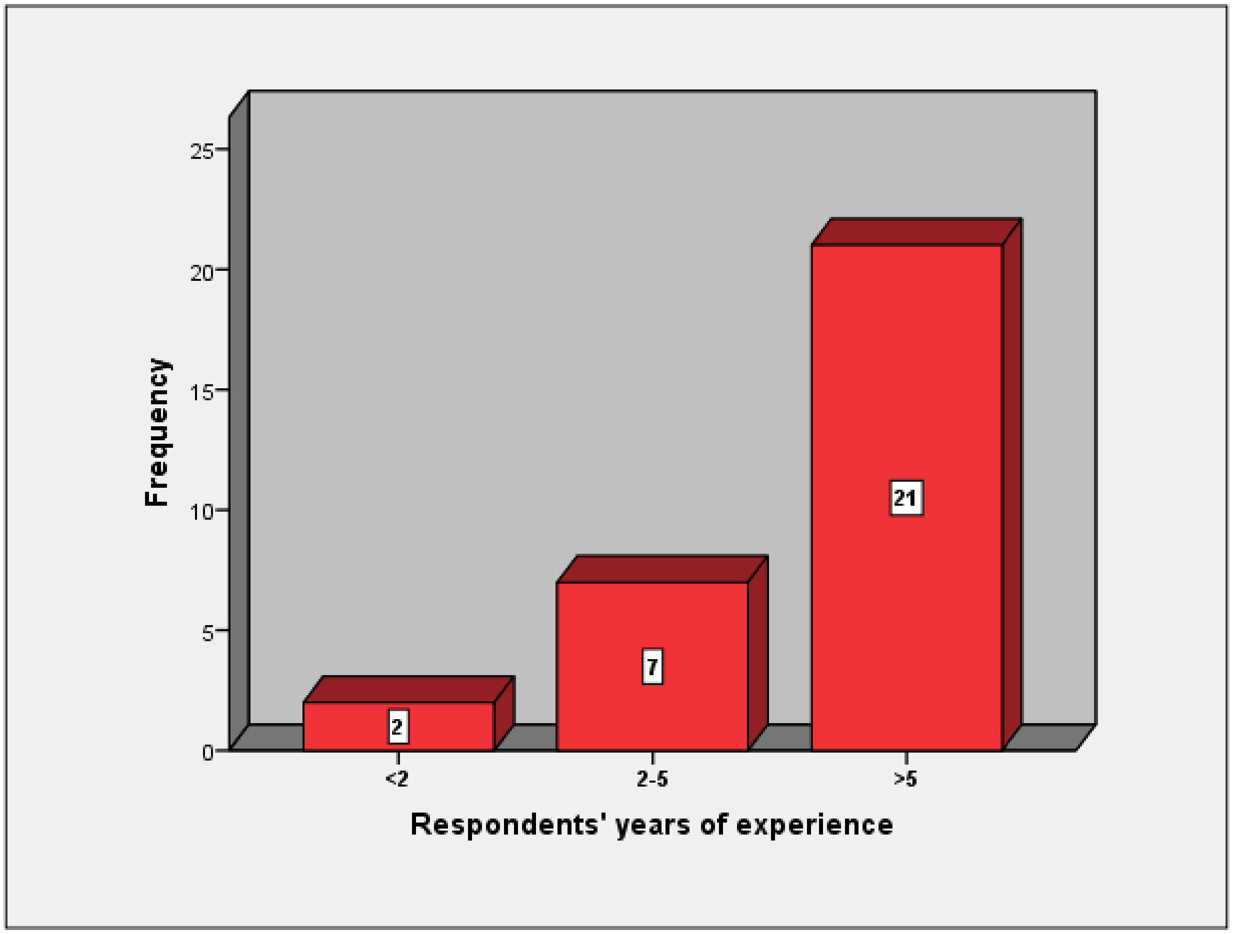
Figure 4.1.2. Respondents' Educational status



Source: Survey data (2018)

With regard to their years of experiences in the project, majority the respondents have accumulated ample amount of experiences in construction projects, and it is elaborated as follows: 70% of the respondents have participated in construction projects for more than 5 years and 23.3% of them have between 2-5 years of experiences. Only 6.7% of the respondents have less than 2 years of experiences in dealing with construction projects. This might indicate that the more they are experienced in undertaking construction projects, the better they might become familiar with construction project risk management practices, if not always.

Figure 4.1. 3. Respondents' years of experience



Source: Survey data (2018)

4.2. General Information about Risk Management Practices of the Companies

It is believed that participants working in different positions with different years of experiences as well as educational levels in construction projects in both companies, it is important to investigate their experiences of project risk management practices. Hence, in a Likert scale of 1-5, the respondents were required to indicate the level of applicability of RMPs to the projects they were engaged in. A level of 1 indicated RMP is not applied to the projects while a level of 5 indicated that the process is very greatly applied to the projects. Thus, table 4.2 sought the general information about risk management practices of the companies starting from risk management planning. As indicated in the table, the respondents rated there was efficient risk management plan (4.3) a frequently applied technique in the firms to determine the success of a projects. Hold meeting to develop risk management plan and defining RM activities in the schedule were techniques applied to some extent with mean of 3.1 whereas developing risk breakdown structure (RBS) and estimating resources and cost required for RM were the least applied methods, recording 287 and 2.63 respectively. This was done in order to determine which technique was frequently practiced in the companies.

Table 4.2. General information about risk management practices

Description	Mean	Std. Deviation
Conducting Efficient risk management plan	4.3	1.08
Hold meetings to develop Risk management plan	3.1	1.06
Develop adequate RBS to define risk categories	2.87	1.14
Estimate resources and cost needed for RM	2.63	.72
Define and include RM activities in the schedule	3.1	1.06
Total mean score	3.2	

Source: Survey data (2018)

4.3. Risk Identification Process

Based on the survey data, most frequently used techniques for risk identification have been identified. For instance, as indicated in Table 4.2, consulting experts (expert judgement), using past experiences and using processes/tools for identifying risks were the most widely applied techniques, with the mean score of 3.8 and 3.6 respectively. In contrast, using check lists, brainstorming session and involving all key project participants in risk identification processes are the least used techniques. This indicates that the companies had commendable experiences of project risk identification process.

Table 4.3. Risk identification process

Description	Mean	St. Deviation
The company has processes/tools for identifying project risks	3.63	1.23
Brainstorming session	2.53	1.03
Using check lists.	3.17	1.33
Conducting interviews with experts/expert judgment	2.83	1.02
Use past experience/review of documentations.	3.77	.878
All key project participants were/ are involved in risk identification.	2.87	1.13
Prepare risk registers for your projects	2.87	1.32
Mean score	3.09	

Source: Survey data (2018)

4.4. Risk Analysis Process

Table 4.4 shows that using risk matrix to identify risks that require the most attention by quantifying their relative contribution to the overall project risk and using a risk matrix that defines probability/likelihood and impact exist in the company to define the probability and impacts of risks in achieving specific project objectives are the most widely used tools/techniques to qualitatively assess risks. This is depicted through the corresponding mean scores of 3.37 and 3.27 respectively. On the other hand, having well established qualitative risk analysis system, identifying risks that require the most attention based on their relative contribution to the overall project risk and having processes in place to quantify risks are applied to the lesser extent by the companies.

Table 4.4. Risk Analysis process

Description	***Mean***	***St. Deviation***
There are established qualitative risk analysis methods and tools.	3.03	1.09
There is a process in place to quantify risks.	2.83	1.26
Assess the probability of achieving specific project objectives.	3.17	1.01
Identify risks that require the most attention by quantifying their relative contribution to the overall project risk	3.37	1.60
A risk matrix that defines probability/likelihood and impact exist in the company.	3.27	1.43
Mean score	**3.13**	

Source: Survey data (2018)

4.5. Risk Response Plan Strategies

Regarding risk response strategies of the companies, acceptable mitigation steps of treating risk must be employed once the project risks have been known and analyzed. These mitigation steps are based mostly on the nature and potential consequences involved in the risk. There are a number of risk response strategies that determine or assist the success of construction project. Table 4.5 shows the arithmetic mean and standard deviation of the rankings rated by respondents. As indicated in the table, risk transfer to the third party (insurance company) is the highest ranked by the respondents with the average mean of 4.0 followed by assignment of personnel for each agreed risk responses and continuous performance improvement (3.73), and assigning responsible personnel (3.53) respectively.

Table 4.5. Risk response strategies

Description	*Mean*	*St. Deviation*
Risk avoidance (Taking another course of action).	2.90	1.27
Risk Transfer to third party (e.g. Insurance company).	4.00	.94
Risk acceptance/ retention.	3.06	1.08
Reduce risk to acceptable threshold level.	2.93	1.14
There is a personnel assigned for each agreed risk responses (e.g. safety personnel, safety management, risk officer)	3.73	1.22
Contingency plan is allocated for time.	3.37	.99
Contingency plan is allocated for cost.	3.23	1.79
Based on the analyzed risks, risk management plan is developed and communicated to all stakeholders.	3.06	1.11
A risk matrix was/is reviewed and updated throughout the life cycle of the project.	3.06	1.22
The risk matrix was/is reviewed and updated throughout the life cycle of the project	3.47	1.52
Undertaking continuous performance improvement through learning and innovation exists.	3.53	.86
Total mean score	3.30	

Source: Survey data (2018)

From the above description, the respondents indicated that risk avoidance and allocating contingency plan for cost are the least applicable techniques with the mean of 2.9 and 2.93. The rest strategies were rated by respondents as applicable to some extent in both companies. The intent to transfer risk is surprisingly the highest on the table; this may indicate that Chinese contractors are risk aversive. The interview data also indicated that respondents use a risk log (register) to document risk items, responsible person, and potential impact, probability of impact, mitigation strategy and periodic review of risks.

4.6. Risk Monitoring and Control

Table 4.6 presents the description of questions related to risk monitoring and control. Identified risks need to be monitored, new risks need to be identified and risk responses must be controlled. This process includes updating the risk register (log) as necessary. As depicted in the table, holding periodic meeting for risk discussion was ranked as highest among respondents. Respondents agreed that risks are often discussed in team meetings (3.37). Respondents agreed that risks are actively and routinely tracked and reassessed (3.03). In addition to the regular meetings, respondents indicated that they hold special meetings to discuss project risks. Another important activity in this process is risk auditing which includes checking the effectiveness of risk response strategies. The respondents indicated that they are making improvements in risk management procedure as a result of lessons learned (3.03).

Table 4.6. Risk monitoring and control

Description	Mean	St. Deviation
Risks are discussed in team meeting.	3.37	1.54
Risk management is always considered as part of the agenda in the project's progress meetings.	3.03	1.09
The controlling process includes a risk log/ risk check list.	2.93	1.28
Project risks are actively and routinely tracked and reassessed.	3.03	1.21
The project team holds periodic meetings specifically for risk discussions.	2.83	.75
You are making improvements in risk management procedure as a result of lessons learned.	3.03	1.15
Mean score	3.04	

Source: Survey data (2018)

4.7. Risk Management Techniques

The risk management tools and techniques is presented in Table 4.7. The overall use of risk management tools and techniques is minimal. Out of the five tools and techniques, open and effective communication channels between/ among project team, the contractors, consultants, client and using risk register/matrix reviewed by the project team/project manager are ranked as the most frequently used risk management practices. The use of strategic risk identification techniques, incorporating risk database system and the use of statistical analysis is rather limited. Both companies rely on expert judgment, experience and intuition to manage project risks.

It is surprising to see that some of the fundamental risk management tools, such as sensitivity analysis, decision trees and influence diagrams, are rarely used for construction projects. These results confirm the findings of Akintoye and MacLeod (1997 in El-Sayegh, 2014) that almost all organizations depend on intuition or expert judgment/experience to manage risks involved in construction projects.

Table 4.7. Risk management techniques

Description	*Mean*	*St. Deviation*
Have open and effective communication channels between/ among project team, the contractors, consultants, client and other project stakeholders.	3.6	.67
Strategies were/are developed to manage the identified risks.	3.13	1.13
Risk register/matrix/database system is developed incorporating the risks identified, controls, responses and residual risks.	2.93	1.14
Project risk manager is appointed to advice and/or manage the risks in the project.	3.47	1.57
The risk register/matrix is continuously reviewed by the project team/project manager.	3.7	1.46
Mean score	**3.40**	

Source: Survey data (2018)

4.8. How well Project Risk Management Practices were applied to the Projects

In a Likert scale of 1-5, the respondents were required to indicate the extent to which they agreed on how well the project risk management practices were applied to their projects including general information about risk management plan, risk identification, risk analysis and ranking, risk response and monitoring and use of risk management tools and techniques. This was done in order to determine which risk management practice was extensively used in the construction projects of the companies. A level of 1 indicated that the risk management practices were not well applied to their project while a level of 5 indicated that risk management practices were very well applied to their project. This was done in order to determine which risk management practices were well applied to the project. Results are presented in the table 4.8 below.

Table 4.8. Proper use of project risk management practices in the projects

Description	**N**	**Mean**	**Std. Deviation**
General information about Risk Management Plan	6	3.20	.57
Risk Identification	7	3.14	.43
Risk Analysis	6	3.13	.18
Risk Response strategies	12	3.30	.33
Risk monitoring and control process	7	3.03	.16
Risk Management Techniques/strategies	6	3.37	.29
Total Mean score		**3.10**	

Source: Survey data (2018)

From the table above, respondents for both projects felt that PRM practices were applied to their projects recording mean score of 3.10. The respondents felt that risk management techniques (3.37) of mean average followed by risk response strategy (3.30), general information about risk management plan (3.20) and risk identification (3.14), were indicated as the well-applicable RMP whereas risk monitoring and control process(3.13) and risk analysis (3.03) were considered as the least applied techniques to their projects. It can be seen that the general extent of application of the six risk management practices was relatively trivial. However, further analysis in the previous sections revealed that most of the risk management practices were not well applied to the projects.

As indicated by respondents, the extent of application of the six risk management practices was adequate to certain extent, recording 3.1 total mean score. However, detail analysis of the application of the risk management practices indicated that some of the practices are applied to some/great extent and some are not well applied to the projects. As shown in the analysis, risk management techniques and risk response strategies were the predominant risk management practice used for the companies recording a mean score of 3.37 and 3.30 as compared to the least used practice of using risk analysis and risk monitoring and control process with mean scores of 3.03 and 3.13 respectively.

Data from interview indicated that respondents had good awareness of risk and very familiar with the term risk management. The first question emphasized mainly on the familiarity of the term risk management. The results proved that nearly all the interviewees are familiar with the term 'risk management'. For instance one of the interviewees explained, "Since I am construction professional, I know what the term risk management means. It is the systematic way of how to managing the risk, which is identifying, planning, assessing, monitoring and controlling. It is a systematic processes of arranging or controlling the project in order to minimize or reduce the exposure of risks. We call it risk management system." (See Appendix C). From this, it can be deduced that the interviewees came across the term through experience or they learnt the term 'risk management' during their time in university.

When asked to identify common risks in construction projects, the interviewees explained risk as major risks, minor risks, political risks and financial risks. An interview from CSCEC via translator explained that there are major risks and minor risks according to the probability of the happening and the impacts it has on projects. For instance, for earth quake during the design, we definitely consider the risks of earth quake according the code requirement. However, there hasn't been earth quake in Ethiopia for hundredth of years; so, it is not a major risk for us on site.

“And for instance during the foundation pit excavation, we will take the risk of foundation pit that surely falling apart or sliding or liking into consideration and take adequate measures in advance to avoid those risks. That the difference between major and minor risks.”

The other question was about the techniques/strategies they often use to apply risk management practices. The respondents indicated that they have a lot of project experiences (typically CSCEC Company) and they not only have experiences in construction, they also have experiences in material preparation and business management. So, the company has very clear picture about the project risk management practices and potential risks of the project. And for each departments, they have summarization of potential risks. And those experiences and potential risks they encountered in previous projects are good references for the coming projects. This depicts that companies highly rely on previous experience when managing project risks (See Appendix C). The other question was raised to reveal the certain techniques used to identify the risks in construction projects. Findings from both data demonstrated that expert judgement and past experiences used as the most common tool to identify risks. Brainstorming and involving all key project participants in risk identification were inferred to be the least used out of the others

One of the interviewees indicated, “for instance, before the start of the project, we carry out risk identification step by step. We know and identify potential risks and common risks of the company, and by the time of implementation we revise each risk. When we do the same for safety”.

The respondents expressed their ideas on the risk mitigation strategies they often practice as follows, “We definitely have insurance but the insurance only covers the economic losses we intend to take precautions. In the first place, we avoid risks from taking place. Because from our previous experiences I think we have had a very good picture about all the potential risks of a project and we have adequate counter measures, solutions for each of these risks”. It is a long process of experience and summarization and we put them together it has become a system of our risk management. For instance, evidence from Table 4.5 also suggests that both companies seem more of risk averse because majority of the respondents indicated transferring risks to third party (typically to insurance company) is more likely practiced risk response strategy with 4.0 mean average. A proactive risk avoidance strategy is a good practice of CSCEC project.

It is clearly evident from the responses of the participants that there is no formal risk management practices in their firms. The respondent on the contractor side has clear idea of what risk is and what types of risk affect projects; however, based on response from the contractor (project manager), risk is viewed as safety risk alone. When asked about risk, his response was "… for safety we have different kinds of safety training programs for different groups of workers onsite for different purposes. And we have also safety engineer and project team to identify any safety hazards on site and to prepare solutions accordingly and also we have setting up safety regulations, the management rules for everybody on site", Of course, this company had good safety practices and achievements through communicating its workforce in a very proactive; both companies also assigned safety personnel and safety management departments by believing zero harm to people and assets; however, this clearly shows he viewed risk only as safety issue.

It is evident that risk identification, assessment, and response are done in an informal way. Most of the decisions on risk are based on intuition and past experiences. Hence, the risk management process is not systematic as it should be. The client representative points out that on some projects, meetings are held during commissioning rather than prior to contract award. At such meetings, the individuals present brain storm on issues that could affect the project.

On the other hand, respondents from CSCEC project confirmed that they have different departments through which they can monitor and control risks. They indicated that they have set up different departments for all the risks may happen on site accordingly, and for instance, they have construction department, technology department, code of ethics department, material department, safety department, business department and so on. Each have [has] their work for the corresponding risks. And the project managers of these project departments will coordinate every department in facing, monitoring and resolving all their corresponding risks. And also the constructions for the project is done by area and by sections. For each area and for each section of the project, it carries its own risks. And for those risks, they have their proposals prepared in advance. And during the actual implementation, they will have related departments involved and will make adjustments according to the actual situations of construction (Appendix C). This may imply that Chinese companies have good experiences of risk monitoring and control strategies through proactive way of monitoring and controlling risks. Therefore, as revealed in the previous section, risk management techniques and risk response strategy were the largest risk management practice used in the companies. Perhaps, this might show that the companies would perform well in the risk management techniques and risk responses.

Data obtained from notes taken during interview with PM of CBE, client side, has also confirmed that close supervision of the works at each milestone and strong collaboration with all stake holders greatly helped in mitigating unforeseen project risks at the post contract stage. The client, the consultant and the contractor organizations have strong collaboration and communication in dealing with risks in terms of time, cost and quality performance. According to the PM explanations, the three parties manage risks in proactive way sub consciously without tracking through risk management processes.

CHAPTER FIVE

Conclusions and Recommendations

5.1. Conclusions

The overall goal of risk management process is to maximize the opportunities and minimize the consequences of a risk event. According to the Guide to the Project Management Body of Knowledge (PMBOK/PMI, 2013), risk management in a project consists of risk identification, risk assessment, risk response and risk monitoring and control processes. The risk identification process aims at deciding potential risks that may affect the project. During the risk assessment the identified risks are evaluated and ranked. The risk response process is directed to identifying the way of dealing with the project risks. Once the risks have been identified, estimated, evaluated and responded to, risk monitoring takes over control and plays a dominant role in reviewing the status of the risks. This step concludes the risk management process.

The level of competition and complexity of construction projects add to the regular construction risks. In response to these risks and challenges, companies need to develop and implement risk management processes. The Project Management Institute (PMI) project risk management processes of risk management planning, risk identification, risk assessment (qualitative and quantitative), risk response planning and risk monitoring and control should be followed.

Participants in the current study indicated that they apply these practices especially risk identification, and risk management techniques. Even though both construction companies employ risk management practices to some extent, there is a great disparity between the two companies regarding their maturity level. For instance, CSCEC Company has developed well established risk management system as compared to China Wu Yi Company which is recently established, in relation to other Chinese construction companies. However, overall the ratings on the application of risk management techniques is not high, and qualitative techniques obtained much higher ratings than quantitative techniques, suggesting there is much room for improvement for using different risk management approaches, especially quantitative techniques. For instance, some of the risk management activities that are found to be insufficient include developing RBS to define risk categories, estimating resources and cost needed for risk management, conducting brainstorming session with all project key participants during risk identification, establishing qualitative and quantitative risk analysis methods and techniques, and reduction strategies etc. are among others.

The survey results also showed that for risk identification, the most common techniques used were ‘checklists’, ‘risk register’, ‘past experience’ and ‘expert judgement’; for risk analysis, the preferred tools used were ‘risk matrix that defines probability/likelihood and impact exist in the company**’** and assess the probability of achieving specific project objectives’. For Risk response, respondents stated that the tools ‘avoid the occurrence through proactive way’ and ‘Transfer to third party’ were the most common methods used when responding to risk. For risk monitoring, it was found that the majority of the respondents indicated ‘the project team holds periodic meetings specifically for risk discussions’ as predominant technique. The predominant risk mitigation technique used in the companies was risk transfer strategy.

5.2. Recommendations

Based on the best practices and identified insufficiencies in the current study, the following recommendations are made. For instance, one of the interviewee from CSCEC stated, “The key is to have preparations in advance and in the implementation process to take as much as precautions as possible to prevent risks to taking place. For the other Ethiopian building contractors and their risk management, we believe it is better to have in advance risk management system to manage their projects well because construction projects are prone to high risks unless properly managed.”(KII-3) (See Appendix C). Hence, Participants in a questionnaire survey and interview of both construction companies forwarded the following recommendations.

1. Construction firms (local and international), who are undertaking projects in Ethiopia, need to incorporate project risk management plan into their projects. Companies should assign project risk manager as a key professional in their construction projects.
2. Project risks (by both local and international contractors in the country) need to be professionally and technically handled by experts starting from risk identification to the risk monitoring and control.

3. All stakeholders in construction industry in Ethiopia, need to be aware of the importance of project risk management in building construction and act accordingly.
4. Construction companies in Ethiopia should consider risk management system during bid processing (methods of implementation).
5. The government therefore should enforce the contractors to incorporate risk management guidelines and policy in their project management planning especially whenever multi story buildings are undertaking.
6. Construction companies in Ethiopia are required to identify risks as early as possible, hold meetings to analyze all the risk matrix and make as detail as possible, improve their record keeping practices to enhance their ability to estimate and assess probabilities of potential risks.
7. Developing strong communication with all parties in a project and conducting periodic meetings with project managers and project team staff regarding risk management as one of the core element of project management tools (in addition to cost, time and quality). Conducting risk identification discussion, risk mitigation plan, monitoring and reviewing the mitigation plan timely.
8. Construction companies working in Ethiopia (either local or international) need to design risk management policy and guidelines in order assure project success.
9. The regulatory framework of construction industry that fits for construction projects should be strengthen by including policies of construction risk management. In addition, participants recommended it is believed that to take top to bottom approach to risk management i.e. to push forward risk management from national governmental level to increase the standard for risk management. For instance, the government could have more encouragement and supervision for each of the company to carry out the details of risk management in construction projects on site.

Limitations of the study

1. Due to limitation of time and resource, more reliable and informative method such as maturity assessment of the companies based on artifacts and the use of focus group in conducting risk management plan or practice were not used. The research used questionnaires surveys and key informant interview.
2. The other limitation was all respondents were too busy with tight schedule of the projects so that it was very tiresome to get information on time.
3. Finally, the communication gap was another barrier due to language constraint. Majority of the respondents speak Chinese language so the researcher had to get translator, particularly for the interview data. Since there was a single translator, it was also difficult to interview all informants separately. So, the interview was held at a time having all the interviewees in onsite office via single translator.

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Appendices

Appendix A

Addis Ababa University

School of Commerce

Department of Project Management

Survey Questionnaire to be filled by project managers, project team, project contractors and consultants

Dear Respondent,

I am a postgraduate student at AAU, School of Commerce. I am conducting a research on "Project Risk Management Practices of selected Chinese Building Contractors in Ethiopia". This is in partial fulfillment of the requirements for Masters of Project Management. The aim of the project is to investigate Risk Management Practices of selected Chinese building contractors in Ethiopia.

This survey questionnaire is an important part of data collection in the study. The questionnaire consists of three sections with a total of 47 questions. It takes approximately 30 minutes to answer the questionnaire. Kindly fill the questionnaire to the best of knowledge. The information will be used only for research purposes and will be treated with strict confidence.

Your assistance will be highly appreciated. Thank you.

Yours faithfully,

Sileshi Chemir

E-mail: csileshi@yahoo.com

Mobile: +251912208143

Section A: Biographical Data

1. What is your position?

Project Manager	[ ]
Project Engineer	[ ]
Member of Project Implementation Team	[ ]
Risk chief /officer	[ ]
Risk Auditor	[ ]
Other: Specify................................	

2. Educational status: PhD [ ] MA (M Sc.) [ ] B.Sc. [ ] Diploma [ ] other:____________

3. How long have you been involved in construction project implementation?

Below 2 years [ ]
Between 2 and 5 years) [ ]
Over 5 years [ ]

Section B: Risk Management practices, tools and techniques/strategies applied to the project.
Kindly indicate the extent to which the following project risk management practices and strategies are applicable in your project(s) on a 5-point scale where, 1= Not Applied (NA) 2= Applied to some extent (ATSE) 3= well applied (WA) 4= greatly applied (GA) and 5= Applied to very great Extent (VGA). And Mark with a tick (√) against the most applicable response.

1.	General information about Risk Management Plan	5	4	3	2	1
A	The presence of efficient risk management plan in your company.					
B	Hold planning meetings to develop the risk management plan.					
C	Develop Risk Breakdown Structure (RBS) to define risk categories.					
D	Estimated resources and costs needed for risk management activities and include them in the project budget.					
E	Define and include risk management activities in the schedule.					
2	Risk management practice	5	4	3	2	1
2.1	Risk Identification					
A	The company has processes/tools for identifying project risks such as:					
B	Brainstorming session.					
C	Using check lists.					
D	Conducting interviews with experts/expert judgment.					
E	Use past experience/review of documentations.					
F	All key project participants involved in risk identification.					
G	Prepare risk registers for your projects.					
2.2	Risk Analysis					
A	There are established qualitative risk analysis methods and tools.					
B	There is a process in place to quantify risks.					
C	Assess the probability of achieving specific project objectives.					
D	Identify risks that require the most attention by quantifying their relative contribution to the overall project risk.					
E	A risk matrix that defines probability/likelihood and impact exist in the company.					

2.3	Risk Response strategies	5	4	3	2	1
A	There are techniques of risk responses in place such as:					
B	Risk avoidance (Taking another course of action).					
C	Having Contingency plan.					
D	Risk Transfer to third party (e.g. Insurance company).					
E	Risk acceptance/ retention.					
F	Reduce risk to acceptable threshold level.					
G	Combinations of retention, reduction and transfer responses to risk.					
H	There is a personnel assigned for each agreed risk responses (e.g. safety personnel, safety management, risk officer)					
I	Contingency plan is allocated for time.					
J	Contingency plan is allocated for cost.					
K	Based on the analyzed risks, risk management plan is developed and communicated to all stakeholders.					
L	A risk matrix was/is developed for the project.					
M	The risk matrix was/is reviewed and updated throughout the life cycle of the project.					
N	Undertaking continuous performance improvement through learning and innovation exists.					
2.4	Risk monitoring and control process	5	4	3	2	1
A	Risks are discussed in team meeting.					
B	Risk management is always considered as part of the agenda in the project's progress meetings.					
C	The controlling process includes a risk log/ risk check list.					
D	Project risks are actively and routinely tracked and reassessed.					
E	The project team holds periodic meetings specifically for risk discussions.					
F	You are making improvements in risk management procedure as a result of lessons learned.					
2.5	Risk Management Techniques/strategies	5	4	3	2	1
A	Have open and effective communication channels between/ among project team, the contractors, consultants, client and other project stakeholders.					
B	Strategies were/are developed to manage the identified risks.					
C	Risk register/matrix/database system is developed incorporating the risks identified, controls, responses and residual risks.					
d	Project risk manager is appointed to advice and/or manage the risks in the project.					
E	The risk register/matrix is continuously reviewed by the project team/project manager.					

SECTION C: General Section

1. In your opinion, what three measures would you consider important for improving project risk management practices in order to enhance the success of your/any project?
a. ____
b.____
c.____
2. What recommendations would you make that will improve project risk management in building constructions in Ethiopia?

____

____

____

Thank you for your participation

Appendix B

Addis Ababa University

School of Commerce

Department of Project Management

Letter of consent

Dear Sir/Madam, first, I would like to thank you for volunteering to this interview session. The focus of the interview is to collect data on ' Risk Management Practices of Selected Chinese Building Contractors in Ethiopia.' For this matter, I have chosen you expecting that as a project Manager/ coordinator/ consultant/ project team, you reflect your experiences on project Risk Management practices in your Organization so as to meet the organizational goals. There is a need to record what we are talking for listening it again while analyzing the data. I only use it for this research purpose and automatically discard the audio-recorded as soon as the transcription is completed. So, feel free to express what you have in your mind and what you were/are really practicing in your company regarding the questions I am going to forward. There is no right or wrong answer to the questions. Your honesty and thoughtfulness in answering the questions is greatly appreciated and will directly or indirectly benefit your career/company.

I understand this information and agree to participate fully under the conditions stated above:

Sign: ____ Date: ___________________

Thank you very much. Now, let us begin our discussion.

1. What is risk for you? Are you familiar with the term 'Risk Management'?
2. What does project risk management mean?
3. Can you identify the most common risks in construction projects? If yes, what are they particularly in your company?
4. How much are you familiar with the following terms: Risk Plan Management, Risk Identification, Risk Analysis, Risk Response and Planning, Monitor and Control Risks?
   a. What techniques/strategies are often used for 'Risk Identification'?
   b. What techniques/strategies are often used for 'Risk Analysis'?
   c. What strategies are often used for 'Risk Response' in your company?
   d. How do you monitor and control risks in your company?
5. Do you think it is important to apply the process of risk management in construction project?

Appendix C (Sample interview Transcription)

Addis Ababa University

School of Commerce

Department of Project Management

Letter of consent

Dear Sir/Madam, first, I would like to thank you for volunteering to this interview session. The focus of the interview is to collect data on ' Risk Management Practices of Selected Chinese Building Contractors in Ethiopia.' For this matter, I have chosen you expecting that as a project Manager/coordinator/consultant/project team, you reflect your experiences on project Risk Management practices in your Organization so as to meet the organizational goals. There is a need to record what we are talking for listening it again while analyzing the data. I only use it for this research purpose and automatically discard the audio-recorded as soon as the transcription is completed. So, feel free to express what you have in your mind and what you were/are really practicing in your company regarding the questions I am going to forward. There is no right or wrong answer to the questions. Your honesty and thoughtfulness in answering the questions is greatly appreciated and will directly or indirectly benefit your career/company.

I understand this information and agree to participate fully under the conditions stated above:

Sign: ____ Date: ____________________

Thank you very much. Now, let us begin our discussion.

China Wu Yi con project

Interviewer: 1. What is risk for you? What is the term 'Risk Management'?

KII 001: Risk is an opportunity for getting the project accomplishment under certain situation. It is the probability of achieving project success or susceptible for damage. It depends on the situation and the way that you defeat that risks.

Interviewer: 2. Are you familiar with project risk management? What does it mean?

KII 001: yeha. Since I am a cons…construction professional, I know what the term what the term risk management means. It is the systematic way of how to managing the risk, which is identifying, planning, assessing, monitoring and controlling. It is a processes of ehhh…the systematical way of arranging or controlling the project ehaa…in order to minimize or reduce the exposure of risks. We call it risk management system.

Interviewer: Thank you very much and the next question is:

3. How familiar are you with the following terms: Risk Plan Management, Risk Identification, Risk Analysis, Risk Response and Planning, Monitor and Control Risks?

KII 001: yeha, just since I am professional, of construction project mgt, I'm familiar with these terms. Risk plan management is the way how you plan at the moment of your planning or scheduling of your project. Risk identification is a means by which risk is prioritized based high factor or impacts of risks on a project. Risk analysis is how you analyze the risks that you have already categorized. Risk response planning is how to respond to risks that might happen in the construction project. Risk monitoring is a system you might reduce or might mitigate or might transfer to insurance, it might be like that…

Interviewer: 4. What techniques/strategies do you often use to apply risk management practices? (for 'Risk Identification'?, for 'Risk Analysis'?, for 'Risk Response'?, and how do you monitor and control risks in your company?)

KII 001: Actually, there are certain types of risks that will exposed for the project, but our company only focus on cost and time effect of the risks. So, they follow schedule. They always make amendment or modification on the schedule in order to reduce the time extension or cost overrun of the project. So, ehhh… in other way round, there are political or financial risks, but this kind of risks cannot be handled by our project. The only thing that we focus on is cost and time factor of the risks. This can be handled by following the scheduling as per mile stone.

Interviewer: Thanks

5. What kind of risk mitigation strategies do you mostly employ in your company?

KII 001: By the way, we have all at risk insurance in our contract**.** If risk is beyond the company capacity, they usually go to insurance because we have all at risk insurance. There is a type of insurance. One of the insurance is all at risk insurance. That is jointly get the insurance between the client and contractor. That insurance is belongs to our contract. The other thing most of the time ehaa this project has a big time factor. So, in order to minimize the bureaucracy that we have in our country, just we mitigate these risks**.** For example, there is a car accident or car damage with falling stone in our project. Just, the contractor mitigate that risk, they made good for that damage not transfer to the insurance. They usually use mitigation system by themselves without transferring to insurance even if there is insurance. By the way big problem in this company is it doesn't have a contingency plan in order to complete the project as stated milestone and in order to reduce the cost overrun or in order to compensate that overrun. It is a big fault. So, there is no contingency plan here in our project

Interviewer: 6. Do you think it is important to apply the process of risk management in construction project? How?

KII 001: Ehh…Absolutely, in my opinion, risk management department has to be established in any construction project company. The government must interfere with such consideration as policy issue. Unless and otherwise we will be exposed to so many challenges that might be out of control. Therefore, it is a must in my opinion. It is a must

Interviewer: 7. What do think are barriers of risk management practices particularly in developing countries?

KII 001: Thank you. Ehahh…by the way risk, if you mitigate risk or if you consider risk, you mitigate time overrun or cost overrun. So, it's better to consider risk during scheduling, during scheduling. It is not good to plan without considering risk. We'd better to make our schedule with consideration of risks using qualitative and quantitative analysis like Monte Carlo simulation method in order to consider those risks. So, the most barrier for our risk management practices ehhahh…the way how we schedule, the way how we consider ehhhah…what risk mean, the way how we understand risk management practices. There is no training. The other one is lack of awareness. So, all these things are barriers of risk management practices. Even even institutes/companies should also open risk management department. So, at that moment the institutes/companies make some awareness on the industry. After all they know the cost benefit analysis. Most of our contractors know nothing about risk management system. So, it has to be considered. It has to be institutionalized. Unless otherwise these barriers may not be solved in my opinion.

Interviewer: Thank you very much for your participation and precious time.

KII 001: It is okay

Key informant interview two (CSCEC)

KII 003: hahh…for safety we have different kinds of safety training programs for different groups of workers hahh onsite for different purposes. And we have also safety engineer and project team to identify any safety hazards on site and to prepare solutions accordingly and also we have setting up safety regulations, the management rules for everybody on site.
Interviewer: What techniques/strategies do you often use to apply risk management practices?
KII 003: Ehahh… we know CSCEC have a lot of project experiences and we not only have experiences in construction, we also have experiences in material preparation and business management. So, we have very clear picture about the major risks, potential risks of the project. And for each departments, we have summarization of potential risks. And those experiences and potential risks we encounter in previous projects are good references for the coming projects. This one.
Interviewer: what kind (s) strategies do you employ for risk response/mitigation?
KII 003: We definitely have insurance but the insurance only covers the economic losses we intend to take precautions. In the first place, we avoid risks from taking place. Because from our previous experiences I think we have had a very good picture about all the potential risks of of a project and we have adequate counter measures, solutions for each of these risks. It is a long process of experience and summarization and we put them together it has become a system of our risk management. For the risks, there are major risks and minor risks according to the probability of the happening and the impacts it has on projects. For instance, for earth quake there ehahh during the design, we definitely take the risks of earth quake according the code requirement. However, there hasn't been earth quake in Ethiopia for hundredth of years. So, it's not our major risk for us on site. And for instance during the foundation pit excavation, we will take the risk of foundation pit that surely falling apart or sliding or liking into consideration and take adequate measures in advance to avoid those risks. That the difference between major and minor risks.

Interviewer: How do monitor and control risks in your company?

KII 003: Ehhh…we have set up different departments for all the risks may happen on site accordingly, and for instance, we have construction department, technology department, code of ethics department, material department, safety department, business department and so on. Each have [has] their work for the corresponding risks. And the project managers of these project departments will coordinate every department in facing, monitoring and resolving all their corresponding risks. And also the constructions for the project is done by area and done by sections. For each area and for each section of the project, it carries its own risks. And for those risks, we have our proposals prepared in advance. And during the actual implementation, ehhh… we will have related departments involved and we will make adjustments according to the actual situations of construction.

Interviewer: Are all the departments you have listed found in the company?

KII003: yes, all the departments are in this building. All the managers and team members have responsibilities and accountability to manage risks in their respective departments.

Interviewer: Do you think it is important to apply risk management processes in construction projects? How?

KII003: Yes, safety and risk management is crucial for the success of one project because you could prepare all kinds of proposals in advance, but when it comes to implementation, it during the process of construction, and you have to carry out ehhh…each of those proposals and each of those project management to detail. And for instance, for the quality management, you have to have strict implementation of quality management on site for the quality of the project and for the success of the project, and for instance for safety management it's also crucial to carry out those precautions and proposals on site to prevent any major safety accident. If there are any major safety accident, it could cause very great damage to the project even the project is very good in terms of quality.

Interviewer: General recommendations

KII003: ehh…The key is to have preparations in advance and in the implementation process to take as much as precautions as possible to prevent risks to taking place in the first place.

KII004: For the other Ethiopian building contractors and their risk management, we belief it's better to have in advance risk management system to manage their projects well because construction projects are prone to high risks unless properly managed.

KII005: We belief that to take top to bottom approach to risk management. I mean to push forward risk management from national governmental level to increases the standard for risk management.

KII006: for instance, the government could have more encouragement and supervision for each of the company to carry out the details of risk management in construction projects on site.

Interviewer: Thank you very much for your attention.

KIIs: You're welcome.